IN THE CLAIMS

1. (Currently Amended) A spin-valve sensor, comprising:

a sensing layer formed of a first ferromagnetic material;

a reference layer formed of a second ferromagnetic material;

a spacer layer interposed between the sensing layer and the reference layer, the spacer layer formed of a nonferromagnetic conducting material

pinning layers disposed adjacent to ~~one side of~~ the reference layer, the pinning layers comprising at least two antiferromagnetic (AFM) binary Ni-Mn films.

2. (Original) The spin-valve sensor of claim 1, wherein the at least two AFM films comprise a first AFM film in contact with the reference layer and a second AFM film not in contact with the reference layer.

3. (Original) The spin-valve sensor of claim 2, wherein the first AFM film has a higher Mn content than the second AFM film.

4. (Original) The spin-valve sensor of claim 2, wherein the first AFM Ni-Mn film has a Mn content in the range of between about 54 and about 60 at%.

5. (Original) The spin-valve sensor of claim 2, wherein the first AFM Ni-Mn film has a Mn content of about 57 at%.

6. (Original) The spin-valve sensor of claim 2, wherein the second AFM film has a Mn content in a range of between about 49 and about 54 at%.

7. (Original) The spin-valve sensor of claim 2, wherein the second AFM film has a Mn content of about 50 at%.

8. (Original) The spin-valve sensor of claim 2, wherein the first AFM Ni-Mn film has a thickness in a range between about 25 and about 225 Å.

9. (Original) The spin valve sensor of claim 2, wherein the first AFM Ni-Mn film has a thickness of about 125 Å.

10. (Original) The spin-valve sensor of claim 2, wherein the second AFM Ni-Mn film has a thickness in the range of between about 25 and about 225 Å.

11. (Original) The spin-valve sensor of claim 2, wherein the second AFM Ni-Mn film has a thickness of about 125 Å.

12. (Original) The spin-valve sensor of claim 2, wherein the first and second AFM Ni-Mn films have a total thickness in a range between about 200 and about 300 Å.

13. (Original) The spin-valve sensor of claim 2, wherein the first and second AFM Ni-Mn films have a total thickness of about 250 Å.

14. (Currently Amended) A spin-valve sensor, comprising:

a sensing layer formed of a first ferromagnetic material;

a reference layer formed of a second ferromagnetic material;

a spacer layer interposed between the sensing layer and the reference layer, the spacer layer formed of a nonferromagnetic conducting material;

pinning layers disposed adjacent to ~~one side of~~ the reference layer, the pinning layers comprising at least two antiferromagnetic (AFM) binary Pt-Mn films.

15. (Original) The spin-valve sensor of claim 14, wherein the at least two AFM films comprise a first AFM film in contact with the reference layer and a second AFM film not in contact with the reference layer.

16. (Original) The spin-valve sensor of claim 15, wherein the first AFM film has a higher Mn content than the second AFM film.

17. (Original) The spin-valve sensor of claim 15, wherein the first AFM Pt-Mn film has a Mn content in the range of between about 47 and about 53 at%.

18. (Original) The spin-valve sensor of claim 15, wherein the first AFM Pt-Mn film has a Mn content of about 52 at%.

19. (Original) The spin-valve sensor of claim 15, wherein the second AFM Pt-Mn has a Mn content in the range of between about 44 and about 47 at%.

20. (Original) The spin-valve sensor of claim 15, wherein the second AFM Pt-Mn has a Mn content of about 45 at%.

21. (Original) The spin-valve sensor of claim 15, wherein the first AFM Pt-Mn film has a thickness in a range between about 25 and about 225 Å.

22. (Original) The spin-valve sensor of claim 15, wherein the first AFM Pt-Mn film has a thickness of about 125 Å.

23. (Original) The spin-valve sensor of claim 15, wherein the second AFM Pt-Mn film has a thickness in a range between about 25 and about 225 Å.

24. (Original) The spin-valve sensor of claim 15, wherein the second AFM Pt-Mn film has a thickness of about 125 Å.

25. (Original) The spin-valve sensor of claim 15, wherein the first and second AFM Pt-Mn films have a total thickness in a range between about 150 and about 250 Å.

26. (Original) The spin-valve sensor of claim 15, wherein the first and second AFM Pt-Mn films have a total thickness of about 200 Å.

27. (Currently Amended) A spin-valve sensor, comprising:

a sensing layer formed of a first ferromagnetic material;

a reference layer formed of a second ferromagnetic material;

a spacer layer interposed between the sensing layer and the reference layer, the spacer layer formed of a nonferromagnetic conducting material;

pinning layers disposed adjacent to ~~one side of~~ the reference layer, the pinning layers comprising at least two antiferromagnetic (AFM) films selected from the same binary Mn-based alloy system.

28. (Currently Amended) A disk drive system, comprising:

a spin-valve sensor, the spin-valve sensor comprising:

a sensing layer formed of a first ferromagnetic material

a reference layer formed of a second ferromagnetic material;

a spacer layer interposed between the sensing layer and the reference layer, the spacer layer formed of a nonferromagnetic conducting material; and

pinning layers disposed adjacent to one side of the reference layer, the pinning layers comprising at least two antiferromagnetic (AFM) films selected from the same binary Mn-based alloy system;

an actuator for moving the spin-valve sensor across the magnetic disk so the spin-valve may access different regions of written data on the magnetic disk; and

a detector coupled to the spin-valve sensor for detecting changes in resistance of the sensor caused by rotation of the magnetization of the sensing layer relative to the fixed magnetization of the reference layer in response to magnetic fields from the written data.